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TEST REPORT
ON
ENGINE LIFE TEST

[redacted]

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SECURITY INFORMATION

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CONTRACT: RD-13

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Section A. PURPOSE

The purpose of this test was to determine the useful life of the engine before a major overhaul became necessary.

Section B. PROCEDURE

The engine selected for this test was the one previously used for the 50 hour test. (Reference Test Report on 50 Hour Engine Life Test, Oct. 31, 1952). Upon completion of the 50 hour life test, the engine was given a major inspection and re-installed on the test stand for completion of the life test.

The test was run using a conventional ignition system consisting of battery, coil, breaker points, and spark plug instead of the system normally incorporated in the final equipment.

The engine speed was maintained at 6000 RPM with a load equivalent to 150 watts of generated power. Deviations from the above conditions were made at various intervals of time to check peak performance of the engine.

At the start of the test all engine components had been subjected to the previous 50 hours of running time with the exception of the spark plug. The spark plug had been used 25 hours.

Section C. TEST DATA

Note: The elapsed time recorded below includes the 50 hours from the previous test.

Elapsed Time Hours	Observation
61½	The distributor point gap was .010 inch as compared with .015 inch at the start of the test. The gap was not reset. The spark plug gap was .023 inch as compared with .020 inch at the start of the test. The gap was not reset.
69	The distributor point gap was reset to .025 inch. The spark plug gap was .025 inch. The gap was not reset.
77	The spark plug gap was .027 inch. The gap was reset to .020 inch.
82	A piece of lint plugged the carburetor's main jet. The jet was cleaned and the test proceeded.
84	The negative electrode of the spark plug had burned thin on the tip. The thin section was filed and the gap reset.
87	The engine began to run rough. A new spark plug was installed. Engine performance was improved but not normal.
89	The carbon was removed from the exhaust port. This restored normal engine operation.

97 The carbon was removed from the cylinder head.

98 The Brake Horsepower was found to be .340 at 6000 RPM.

106 The spark plug gap was .026 inch. The gap was reset to .020 inch.

114 The distributor point gap was .015 inch. The gap was reset to .020 inch.

122 The maximum brake horsepower was .350 at 6000 r.p.m. (276 watts). Upon completion of the B.H.P. test the carbon was removed from the cylinder head and exhaust port.

130 The spark plug gap was .022 inch. The gap was not reset. The distributor point gap was .015 inch. The gap was not reset. Maximum brake horsepower was .343 at 6000 r.p.m.

138 The spark plug gap was .023 inch. The gap was reset to .020 inch.

143 The engine began to operate roughly because of a weak ignition battery. The battery was replaced.

151 Carbon was removed from the cylinder head and exhaust port.

Note: The spark plug is in good condition after 64 hours of running time.

167 The spark plug gap was .027 inch. The gap was reset to .020 inch.

175	Carbon was removed from the exhaust port.
190	The spark plug was replaced after 103 hours of operation.
192	Carbon was removed from the cylinder head and exhaust port.
219	The spark plug gap was .031 inch. The gap was reset to .020 inch. The distributor point gap was .012 inch. This gap was not reset.
228	The distributor points were refaced and reset to .015 inch.
251	Carbon was removed from the cylinder head and exhaust port.
265	The spark plug was cleaned and reset to .020 inch.
277	The ignition battery and breaker points were replaced. The distributor points had been in operation 277 hours.
292	Carbon was removed from the cylinder head and exhaust port. The spark plug gap was reset.
312	Carbon was removed from the cylinder head and the exhaust port. Prestone lubricant #300 was used with the fuel in place of the S.A.E. 30 oil.
349	The spark plug was replaced after 156 hours of running time.
352	Distributor points were refaced and reset.

370 The engine load was increased to .326 B.H.P. at 6000 r.p.m.

377 The engine load was reduced to .200 B.H.P. at 6000 r.p.m. A new set of distributor points was installed.

380 Carbon was removed from the cylinder head and exhaust port.
Note: With the use of Prestone lubricant, the engine operated 68 hours without necessity of carbon removal.

400 The engine was tested for maximum brake horsepower and for fuel consumption. B.H.P. was .356 (266 watts) at 6000 r.p.m. Fuel consumption was .5 pint per hour for 150 watts output. The test was discontinued.

Section D. CONCLUSIONS

A) All engine components, including rings, lasted the duration of the test.

B) The spark plug was replaced after an average operating time of 115 hours.

C) The carbon was removed after an average operating time of 26 hours using S.A.E. 30 oil.

D) The carbon was removed after an average operating time of 68 hours when using Prestone lubricant #300.

E) The engine developed .356 B.H.P. (266 watts) at 6000 r.p.m. at the end of 400 hours operation as compared with .298 B.H.P. (222 watts) at 6000 r.p.m. at the end of the 50 hour test.

F) Fuel consumption for the 400 hour test was .5 pints per hour with a 150 watt load. Fuel consumption was .383 pint per hour for the 50 hour test.

G) The average temperature at the spark plug was 170°C during the test.

H) The crank shaft bearings showed indications of possible failure after 400 hours of operation.

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